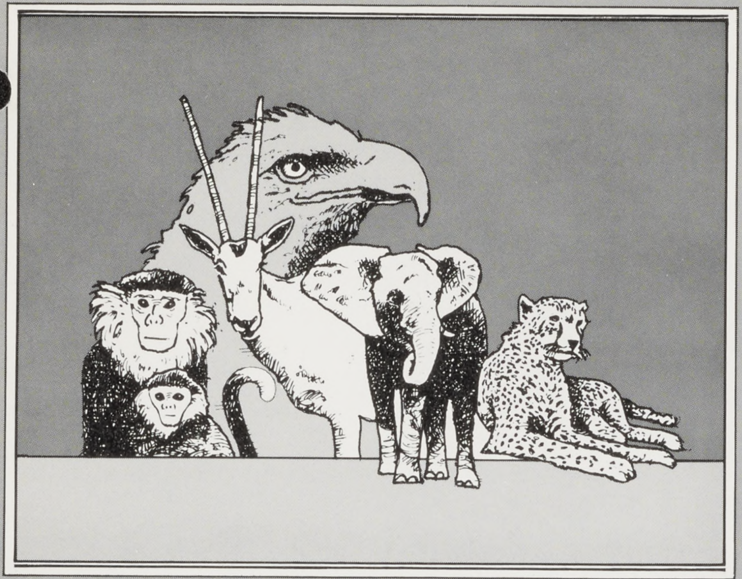


CRES
THE CENTER FOR REPRODUCTION OF ENDANGERED SPECIES
REPORT

P.O. Box 551, San Diego, California 92112

Volume 1, Number 4, 1983

CRES is operated by the Zoological Society of San Diego

## New Drug Offers Possible Cure For Lung Infection In Douc Langurs

For years, veterinarians have struggled with a particular lung infection affecting some of our most precious monkeys—the Douc langurs from Vietnam. Presently, the Zoo has ten Douc langurs, living in four different groups. Langurs live exclusively in foliage in the tropical forests and have an interesting and complicated compartmentalization of their stomachs. When older monkeys died it was invariably found that their lungs had a parasite, a lung mite called *Pneumonyssus simicola*, in areas of destructive lung disease. Fibrosis and cyst formation (bronchiectasis and emphysema) doubtless limited their life span. (The average life span of a Douc langur is ten years or more.) This mite is found in other primates, but there it has generally caused less destruction. The infection is acquired by mouthing, perhaps kissing, and only hand-rearing of neonates might prevent the infection. However, this practice would be undesirable since it is best to raise animals in as normal a social context as possible.

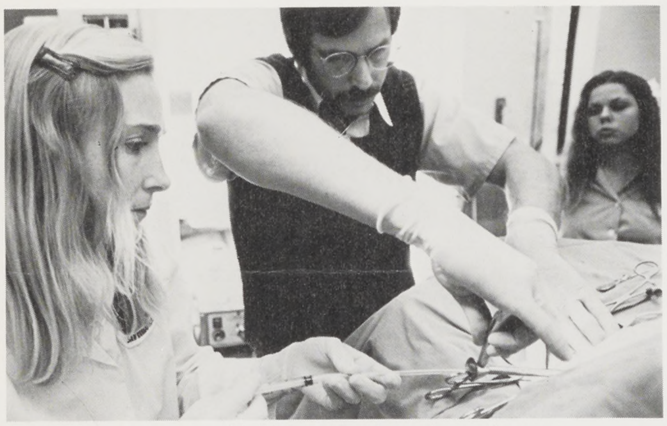
Ivermectin May Provide Answer

Various drugs have been tried on rhesus monkeys using injection and inhalation therapy—drugs that have been known to be effective at least to external parasites. But with the Douc langurs, it was to no avail. It was not until a sample of Merck Co.'s newest compound Ivermectin was obtained through Dr. R. L. Seward, Associate Director of Clinical Research, that a good possibility existed for an effective treatment of the lung mite problem. Ivermectin has proved extremely effective against a number of parasites that have been difficult to treat in the past; and, fortunately, it is quite harmless to the animals. CRES was then fortunate to obtain the cooperation of the veterinary staff at the Regional Primate Research Center at Davis, where rhesus monkeys with known lung mite infection are housed. A single injection of Ivermectin, it would appear, was effective in eliminating the mites, and the animals showed no untoward reaction to the drug. At least these preliminary trials are so encouraging that our veterinary staff has begun to treat our Douc langurs with the hope that long-term follow-up and perhaps other trials in different Centers will terminate a frustrating problem.

Kurt Benirschke, M.D.
Director, CRES

Parenthood By Proxy

The goal of the Zoological Society of San Diego is to make the methodology of artificial insemination as refined, as widely used, and as successful for virtually any animal species as it is now for cattle, horses and humans. Furthermore, CRES is pioneering techniques using frozen sperm cells preserved in our Frozen Zoo cell bank.



Dr. Barbara Durrant artificial inseminating a brown hyena.

Advanced Reproduction Technology

Technology in the field of reproduction is advancing rapidly. The application of the newest techniques of manipulating and evaluating gametes (cells capable of reproducing new life) is of major importance to the propagation of endangered animal species. Freezing semen and embryos for shipment between zoos will soon replace the acquisition of animals from the wild as a method of introducing new genetic material into captive populations. The exchange of gametes is an excellent way to maintain a captive species as close to its natural form as possible, by reducing the effects of inbreeding and genetic drift associated with small, isolated breeding groups.

Less Hazardous Method

Artificial insemination is also less hazardous. Presently, a genetic mixture for zoo animals is obtained by shipping, say, a male to another zoo for the purpose of mating with an unrelated female. Not only does this involve considerable expense in crating and shipping the animal, it also subjects the wild creatures to substantial trauma. Shipping is always fraught with the danger of injury and even death to extremely rare animals, to say nothing of the impracticality of sending large species, such as an adult elephant or rhinoceros, to international zoos. Furthermore, should the animal reach its destination safely there is still no guarantee that the new mate will accept it and happily set about producing babies. It would be much safer, simpler, and less expensive to deliver a small, metal thermos containing chilled sperm cells to impregnate the selected animal.

Freezing Technology

Several zoos around the world are currently collecting and freezing the semen of exotic animals. Freezing methods employed are those proven successful for the semen of domestic animals. However, these semen freezing techniques remain virtually untested in exotic animals because of the lack of large numbers of females available for artificial insemination. Experiments that are now being conducted by CRES reproductive physiologist, Barbara Durrant, will greatly speed the progress of semen freezing technology by developing laboratory tests for sperm viability. The tests, which evaluate sperm morphology (form and structure), movement through cervical mucus and fertilizing capacity, will allow rapid analysis and comparison of various semen freezing methods as well as comprehensive analysis of fresh semen.

Current Analyses Techniques

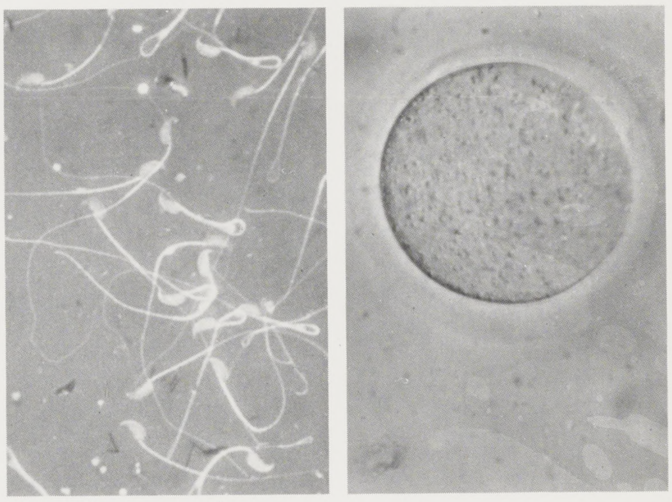
Analyses now performed on semen samples at the Zoo are:

1. Traditional evaluation which includes determination of the percent of spontaneous movement of sperm cells, their direction and speed of progression across a microscope field and the concentration of the sperm in the semen sample.
2. Silver staining for detailed morphological study of sperm cells.
3. A complex triple stain that differentiates live from dead sperm and those that have undergone a chemical reaction that prepares them for egg penetration.

Viability Tests

Two new sperm viability assays being worked on by Dr. Durrant will greatly enhance our ability to predict the fertilizing capacity of fresh or frozen sperm:

1. Cervical mucus penetration which measures the ability of sperm to swim through the natural secretions of the female reproductive tract in order to reach the eggs for fertilization.
2. *In vitro* hamster ova penetration which measures the ability of the sperm to penetrate eggs. Hamster ova, after treatment with a series of enzymes to remove nurse cells and outer membranes, are capable of being penetrated by the sperm of most other animals.



Mammalian sperm and ova

Evaluation

Although this comprehensive sperm evaluation is still being refined, it will soon become a routine method of analyzing the semen of the exotic animals at the Zoo. Fresh semen samples will be analyzed prior to freezing and artificial insemination. Thawed samples will be compared to fresh to quantify freezing damage and determine the best methods for successful freezing of sperm.

To Facilitate The Work Of Researcher Barbara Durrant:

Equipment needs

$11,000–Interference contrast photomicroscope for detailed examination and photography of sperm, ova, and their interactions.